COMPARATIVE STUDIES ON "RIBOSOMAL" NUCLEOSIDE TRIPHOSPHATASES

by

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Phosphatases capable of rapid and specific hydrolysis of ATP, GTP, CTP and UTP have been found in ribosomal prepararations (Rib) from bacterial and mammalian, as well as from plant cells (Fed. Proc. 22: 348 and 23: 532). Sucrose density gradient centrifugation of either crude extracts of these cells or Rib shows that most of the activity is bound to heavy components which sediment in sharp peaks and show little or no pelleting after 2 hours at 100,000 g. In pea seedlings and in rabbit reticulocytes the enzymes are so tightly bound that they cannot be removed without irreversible disruption of Rib. In E. coli, on the other hand, ATPase, GTPase, and CTPase are easily removed by the usual washing procedures, and only UTPase sticks to Rib. These, and a number of other observations speak against membrane localization of these enzymes. The latter also have several properties in common which differ from those of membrane-bound phosphatases described in the literature. Several lines of evidence indicate that in each case four different enzymes are present, one for each triphosphate. Each substrate is optimally hydrolyzed under somewhat different conditions, but the differences between individual enzymes are slight compared to species-related differences in properties between groups of enzymes. (Supported by the following grants: NIH (GM-07924), NSF (G19532), and NASA (NSG-479).

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